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With Dr. Barr's Comments.

CLINICAL NOTES.—EAR DISEASES.

I.

TWO CASES OF SUDDEN AND EXTREME LOSS OF HEARING, ON BOTH SIDES, OWING TO DISEASE OF THE NERVOUS STRUCTURES OF THE EAR; MATERIALLY IMPROVED AFTER THE HYPODERMIC USE OF PILOCARPINE.

II.

CASE OF SCARLET FEVER, COMPLICATED WITH NASAL AND PHARYNGEAL DIPHThERIA; ACUTE SUPPURATION OF BOTH MIDDLE EARS; RAPID DESTRUCTION OF TYMPANIC MEMBRANES; SERIOUS LOSS OF HEARING; FACIAL PARALYSIS; AND ABSCESS OF LACRYMAL SAC; RECOVERY.

BY

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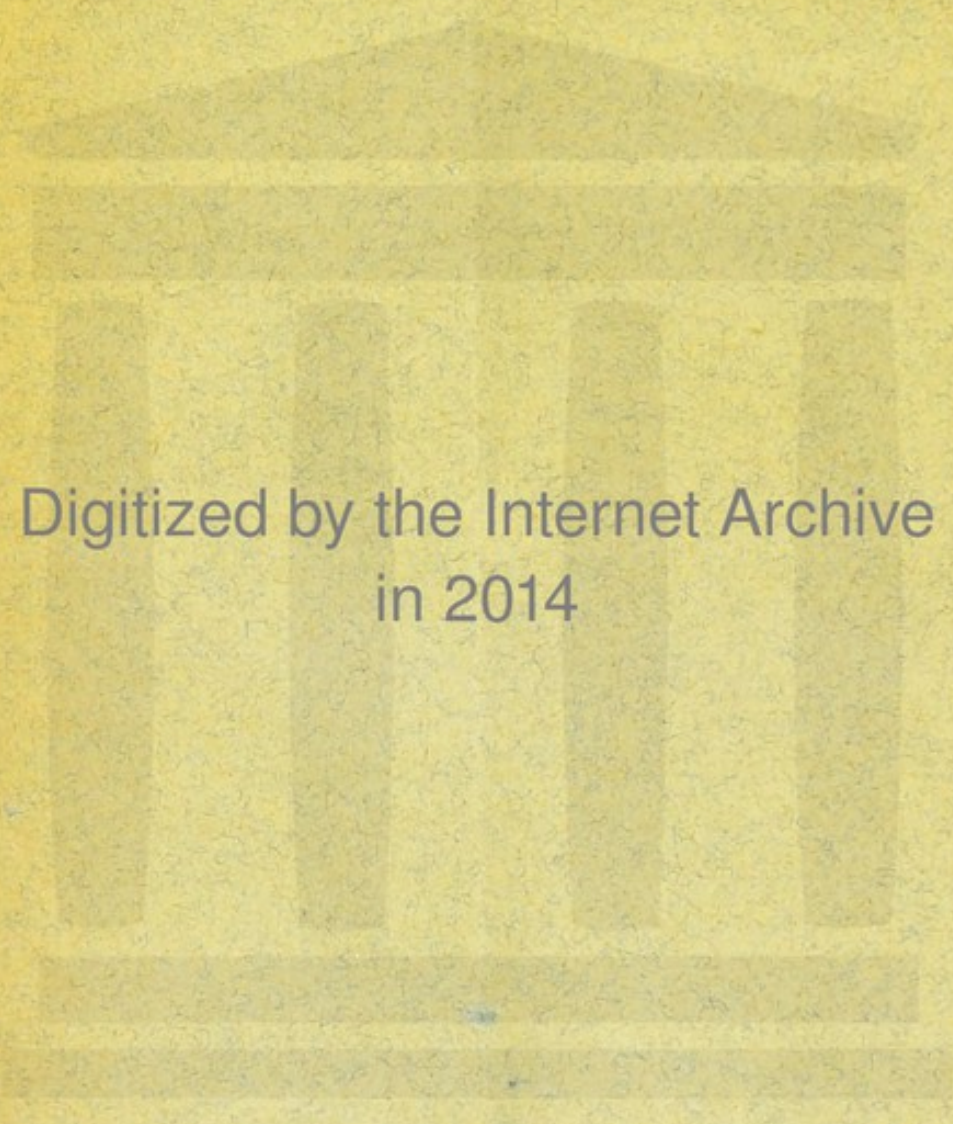
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CLINICAL NOTES.—EAR DISEASES.

I.

TWO CASES OF SUDDEN AND EXTREME LOSS OF HEARING ON BOTH SIDES OWING TO DISEASE OF THE NERVOUS STRUCTURES OF THE EAR; MATERIALLY IMPROVED AFTER THE HYPODERMIC USE OF PILOCARPINE.

(From the "British Medical Journal" of June 12th, 1885.)

DISEASE of the nervous apparatus of the ear is usually so hopeless, and so little affected by remedies, that cases, such as the following, in which favourable results are obtained by treatment, seem worthy of being brought before the profession.

CASE I.—A. B., a ship-steward, aged 22, presented himself for treatment at the Glasgow Ear Hospital, on August 25th, 1884, suffering from almost total deafness. He was a man of pale and unhealthy aspect. Six months before, he contracted syphilis, followed by secondary symptoms, for which, however, he was successfully treated. He was also somewhat addicted to alcoholic indulgence. One of his sisters suffered from phthisis pulmonalis, but the other members of a pretty large family were quite healthy.

Inquiry elicited from him the following account of the origin and course of the disease. About six weeks previously, while crossing the Atlantic on the voyage out to Montreal, he was seized with great nausea, vomiting, and severe giddiness. Accustomed to sea-life, he knew that he was not liable in the least to sea-sickness. By the time the ship arrived at Montreal, the sickness had passed away and the giddiness had become much less. On the afternoon of his arrival, however, while walking in one of the streets of

Montreal, the weather being extremely hot, he was suddenly seized with giddiness so extreme that he staggered and fell to the ground, without losing consciousness. After a short time, he recovered sufficiently to make his way with assistance to the ship. He was put in bed, and the surgeon of the ship prescribed some form of pills.

Up till this time his hearing was unaffected, and, indeed, at no time during his past life had there been to his knowledge any dulness or other disturbance of the hearing on either side. On the following morning, however, he awoke from sleep finding that his left ear was apparently totally deaf. As he lay with the right side of his head on the pillow, he could not hear what was said by a man speaking close beside him. But now a loud noise, like the rush of water, was constantly present in the deaf ear, as well as through the head. Towards night, the hearing of the opposite or right ear seemed also to be passing away, and next morning found him absolutely deaf on both sides, so that the loud shouting of his mates close to his head was by him quite unperceived. The extreme giddiness continued, and the loud rushing noise filled his head.

During the whole of the voyage back to Liverpool he lay in bed in a condition of great giddiness, nausea, and total deafness. When he attempted to walk, his movements were like those of a drunken man—he kept in a straight line for a few steps, and then reeled from side to side. Up till his arrival in Liverpool there had been little if any, pain in his head, but, while in the steamer from Liverpool to Glasgow, he became affected with severe pain in the back of his head, and very especially in the region behind his ears.

In Glasgow he was placed under the care of Dr. Halket, who shaved the head, and applied a cantharides plaster on the surface behind each ear. These were repeated two or three nights afterwards. There was also prescribed by Dr. Halket a mixture containing iodide of potassium chiefly, with good effect, "clearing the head and helping the stomach," as the patient expressed it.

One morning, shortly after his arrival in Glasgow, when he awoke from sleep he experienced a sensation of stiffness in one cheek, and on examination, with the aid of a mirror, he found his face drawn to the left side. The odd appearance which he presented, with shaven head and twisted face, constrained him, even in his sad condition, to smile; this facial movement rendered, of course, the twisted appearance still more striking. In attempting to drink tea or water the liquid tended to trickle out of his mouth. This facial paralysis of the right side was of short duration, passing away in the course of the same evening.

About this stage of the illness a consulting physician saw the patient, and expressed an unfavourable prognosis. His state, nevertheless, began to improve. Under treatment by iodide of potassium the pain in the head diminished and the giddiness became much less, although some tendency to stagger still continued. The deafness, however, remained unaltered, and, as soon as it was practicable, about seven weeks after the beginning of the illness, Dr. Halket sent him to the Ear Hospital for treatment.

On admission, I found his hearing by both aërial and osseous conduction almost quite abolished. Words spoken very loudly into his ears could not be understood by him. In the right ear, however, the voice was heard, although the individual words could not be distinguished. He was unable to hear the loud tick of a watch on either side, pressed firmly on the auricle or on the bones of the head. The sound of a vibrating tuning-fork applied to the bones of the head was also unperceived. Objective examination of the outer and middle ears yielded negative results; on both sides the tympanic membranes presented quite a normal appearance, while the Eustachian tubes were permeable. He did not now complain of the subjective sounds. The vertigo was much less than at an earlier stage of the illness, but there was still a disposition to stagger in walking. The pain in the head was at times quite absent, but now and then it returned in severe paroxysms.

The digestive functions seemed to be much disturbed;

the tongue was thickly coated with a yellowish brown fur, the bowels were persistently constipated, while an extremely foul odour was exhaled by the breath.

He was admitted to the indoor department of the hospital, and at once treated by pilocarpine injections. One of Wyeth's tablets, containing a third of a grain of the drug, was dissolved in six minims of water, and injected underneath the skin of the shoulder every second day for six days, and then every third day for nine days. Copious perspiration followed every application of the remedy. The first produced very considerable sickness and vomiting; on every subsequent occasion there was some nausea excited, but it was much less than after the first. The patient always remained in bed for a few hours after the use of the remedy.

Improvement in the hearing almost immediately manifested itself. A day or so after the first injection the patient noticed some improvement in the right ear, and this improvement seemed to go on gradually almost day by day. In three weeks after admission he could hear and understand, with the right ear, conversation in a voice only slightly elevated above ordinary pitch. In other respects, also, his condition improved. He soon afterwards resumed his occupation of steward on board a steamer.

On the 18th April, 1885, about nine months after the seizure, his state was as follows. On the right side a watch whose normal hearing distance is forty inches, was heard eight inches. On the left it was not heard even on pressure. This does not, however, truly represent his power of hearing speech, which was so good that persons conversing with him did not detect any dulness of hearing. A vibrating tuning fork applied to the middle line of the head was heard better in the right ear.

There were no subjective sounds in the ear or head. The tendency to stagger, which had continued for a considerable time, while in the dark, had passed completely away. The complexion was much healthier looking, the tongue was clean, and the breath was free from the foul odour.

CASE II.—R. McG., a labourer, aged 54, was admitted to the Ear Hospital on the 20th February, 1885. He stated that he had been suddenly affected a fortnight before admission with total deafness while in the act of stooping at his work. He had been out of work for some months, and this sudden loss of hearing occurred just on the morning of his return to work. His bodily health had suffered from the poverty due to the enforced idleness, while his mental condition was depressed, owing to the conduct of a reprobate son. No hereditary tendency to ear-disease and no syphilitic origin could be traced. The shock of deafness, he said, was signalised by a sensation as if a pistol had been discharged in the interior of his head, and immediately afterwards he ceased to hear the noises in the ship-building yard where he was employed, or the voices of the workmen. This was followed by severe pain affecting the whole head, but especially the vertex, and by a sensation in his right ear, "just as if a clock were working inside." There was also slight giddiness.

On admission, it was found that a watch with a loud tick could not be heard on pressure in either ear. The voice could not be heard, although loudly spoken into the right ear; in the left it was heard, but only partially understood. Osseous conduction by the tuning-fork was faint, and the duration of the perception was short. Objective examination of the ear showed a small oval calcareous patch, evidently of long standing, on each tympanic membrane, behind the handle of the malleus. These were probably the results of old catarrhal affections in the middle ears, and had no connection with this attack. Inflation of the middle ears had no effect upon the deafness. A cantharides plaster was first applied behind each ear, without, however, yielding any good result.

Subcutaneous injections of a solution of pilocarpine were then employed. The solution contained at first only one-twelfth of a grain of the pilocarpine, but it was increased, after three or four injections, to one-third of a grain. In the weaker form they were employed daily, but the stronger

solutions were only used every third day. In all, eight injections were employed. The patient remained in bed for six hours after each injection, and free diaphoresis always followed. Slight sickness was excited by the strong solutions. Improvement in the hearing of speech was observed when two injections had been used, and after that there was gradual but steady improvement in the hearing, with disappearance of the subjective sounds.

On April 13th, 1885, two months after the seizure, the condition was as follows. The tick of a watch heard, in normal hearing, forty inches from the ear, was heard eight inches on the right side and one inch on the left. Conversation in an ordinary tone of voice was understood without any difficulty. The osseous conduction of sound by the tuning-fork was heard rather better than the aërial—a circumstance which was probably due to the existence of the old catarrhal affection of the middle ear. The subjective sound had completely disappeared.

OBSERVATIONS.—There can be little doubt that, in the two cases here described, the seat of the mischief was in the nervous apparatus of hearing. It is, however, not possible to determine with certainty in what part of the auditory nerve the lesion existed—whether in its roots in the brain, in its stem, or in its complex terminal expansion in the labyrinth.

In the first case, which was clearly due to syphilis, the gravity of the symptoms seems to indicate that the mischief was intracranial. The premonitory symptoms of nausea and vomiting, the pronounced vertigo and staggering, the severe pain in the back of the head, and the temporary affection of the facial nerve, seem to point to the auditory centres in the cerebellum as the probable seat of syphilitic exudation. On the other hand, in the second case, the lesion was probably labyrinthine and apoplectiform in character (apoplectiform deafness of Knapp), and of the nature of rupture of a small vessel simultaneously in both labyrinths, excited by the stooping posture, and predisposed by a generally enfeebled state of the system. The absence of

marked vertigo is a somewhat noteworthy peculiarity of this case, and suggests that the lesion was more probably in the cochlea than in the semicircular canals.

When we consider the generally hopeless character of lesions of the nervous structure of the ear, it can hardly be denied that the favourable terminations in both of these cases were due to the action of the pilocarpine. Politzer, who was the first to propose this remedy in ear-disease, believed it to be serviceable chiefly in cases of labyrinthine disease of recent and sudden occurrence, and especially in those of syphilitic origin. My experience, as shown in these two cases, seems to confirm this view of the value of pilocarpine. In several instances of labyrinthine mischief gradually coming on in the course of chronic middle-ear disease, where I have used this remedy, there seemed to be no effect produced. As to the explanation of the therapeutic action of pilocarpine, we can only assume that it has an especial power of stimulating the absorbents in contact with the effused products before these have become organised, and that this resorbent effect has also some connection with its remarkable powers of exciting the cutaneous secretion. It seems to have a more decided action upon the intracranial absorbents, and the vascular and lymphatic supply of the labyrinth is in reality the same as that of the interior of the cranium. If this view of its action be correct, it would be reasonable to employ this method of treatment more generally in cases of cerebral apoplexy.

II.

CASE OF SCARLET FEVER, COMPLICATED WITH NASAL AND PHARYNGEAL DIPHThERIA; ACUTE SUPPURATION OF BOTH MIDDLE EARS; RAPID DESTRUCTION OF TYMPANIC MEMBRANES; SERIOUS LOSS OF HEARING; FACIAL PARALYSIS; AND ABSCESS OF LACRYMAL SAC; RECOVERY.

(From "The Lancet" of October 10th, 1885.)

B. M——, a girl, aged four years, of healthy constitution, was attacked by scarlet fever on November 29th, 1883. She contracted it from her brother, fifteen months older, who had been suffering for a fortnight from a somewhat mild form of the disease. The boy took ill in the country, and the girl was removed to Glasgow as soon as it was seen that her brother had fever. Twelve days intervened from the time of separation before she was seized with the malady, the infection having apparently been carried by a third person; and within fifteen hours of her seizure she was reconveyed to the country, where her little brother lay ill, and placed under the care of Dr. Hay of Maryhill. During the first week the disease pursued a course more severe than in the case of the boy, although presenting no alarming symptoms. The rash was abundant, the throat affection moderate, and there was but slight swelling of the cervical glands. There was, however, very considerable delirious excitement at night. The treatment during this period consisted mainly of frequent sponging with tepid water, and the administration internally of chlorate of potash and diluted muriatic acid. At the end of the first week the temperature fell very decidedly, and the crisis of the fever seemed to have been satisfactorily passed.

This improvement was, however, of but short duration, for, at the beginning of the second week, the temperature again rose as high as 105° . Coincident with this rise of temperature, there were marked symptoms of nasal catarrh, the nasal passages becoming much obstructed, and a thin irritating discharge began to exude from the nose. The child also complained of the throat, and the glands of the neck were seen to be more enlarged. However, as examination of the throat revealed at first no more than some increased swelling and redness, it was hoped for a time that this marked aggravation of the condition was due to nothing worse than a simple nasal and pharyngeal catarrh.

In a few days, however, Dr. Hay suspected the real nature of the complication to be nasal diphtheria. This view was confirmed by Dr. Finlayson, who was called in consultation at this stage, and soon it was made only too manifest by the appearance of distinct diphtheritic patches on the soft palate, tonsils, and posterior wall of the pharynx, extending evidently into the naso-pharynx and nasal passages. The nasal obstruction and the increasing swelling of the throat caused great distress in breathing. Large quantities of stringy, viscid, and dark-coloured mucus also constantly collected in the mouth and throat. Tincture of steel and chlorate of potash were now prescribed. The nasal passages were regularly syringed with a solution of chlorate of potash. The stringy viscid mucus was also frequently washed out of the mouth and throat by means of syringing with a warm solution of chlorate of potash. Efforts were also made, though not very successfully, to spray the nasal passages and throat with a solution of lactic acid. A strong solution of nitrate of silver was on several occasions applied with a brush to the patches in the throat. Minute attention was also devoted to the nutrition and stimulation of the child.

Towards the end of the third week her condition was in the highest degree critical, chiefly by reason of the determined resistance which she now offered to the taking of nourishment either in the solid or in the liquid form. The

teeth were so tightly clenched that it was necessary to force open the jaws with the handle of a spoon. As a consequence medicines had pretty much to be abandoned, while it was possible to introduce nourishment only by injecting it in the liquid form through an ivory tube inserted between the teeth. After continuing this method of giving nourishment for a few days it had to be abandoned, not only on account of the terrible struggles which the efforts to separate the teeth involved, but because it was found that although the liquid was injected into the throat it was not swallowed, either passing out by the nose or returning by the mouth. It was remarkable that although the child was in a state of great prostration she showed extraordinary power in resisting the separation of the teeth. Nutrient and stimulating enemata were now resorted to, and no further efforts in the meantime made to feed by the mouth. For two days or thereabouts the bowel retained the nutrient enemata, but after that they came away immediately after being injected.

At this time—towards the beginning of the fourth week—the child's condition seemed so critical that the friends and medical attendant regarded a fatal issue as almost inevitable. At this crisis Dr. Finlayson, who had already seen the child thrice in consultation, suggested that while we should refrain from forcible efforts to give nourishment or medicine, we should, as the child lay prostrate on her back, pour a few drops of cold water on the clenched teeth, so that the water might gradually permeate through between the teeth, and from its grateful coolness induce the child to swallow. This was done, and it was noticed that when the cold water reached the mouth through the teeth she swallowed it. This operation was frequently repeated and always with the same result. A half-cupful of milk with the addition of a teaspoonful of whisky was now prepared and administered in the same way, though it took half-an-hour to dispose of that quantity. This course seemed to inaugurate a distinct change for the better. Several cups of milk containing whisky were swallowed

during the next twenty-four hours, and the child began to open its jaws and willingly to receive nourishment. Gradually various other forms of nourishment were taken, such as Brand's essence of beef, and, as might have been expected, improvement in the general condition soon followed.

While the disease was at its worst, about the end of the third week, there appeared a purulent discharge from both ears. I had previous to this occasionally examined the interior of the ears, one of these examinations having been made two days before the discharge appeared, without anything abnormal being found in the appearance of the tympanic membranes. The condition of the child at this stage, however, forbade the satisfactory examination of the ears. Two days after the first appearance of the discharge, inspection of the interior of the ears showed that both drum membranes were in great part destroyed, and that granular excrescences had already begun to sprout up. The walls also of the deep parts of the external auditory canals seemed to have a diphtheritic coating.

Efficient treatment of the ears was rendered difficult on account of the prostrate state of the child, but at least once a day, sometimes oftener, both ears were gently syringed with a warm solution of boracic acid, then carefully dried with absorbent cotton, and a small quantity of the acid, finely powdered, insufflated into the interior. As the child began to improve in its general condition this method of treatment was repeated every eight hours. The discharge nevertheless continued very profuse.

Though the general improvement was maintained, at the end of the fourth week another complication arose. The skin of the right cheek became intensely inflamed and over the lacrymal sac the tissues became much indurated. This was attended by a fresh elevation of temperature and increased restlessness. In the course of a few days an abscess formed, evidently in connexion with the lacrymal sac. This was opened and a quantity of pus evacuated, after which the inflammatory swelling gradually subsided

without any operative interference. The parts did not, however, return to their natural condition for fully six weeks afterwards.

About the middle of the fifth week, as the swelling of the right cheek, due to the lacrymal abscess, was subsiding, it was noticed that that side of the face was less mobile than the opposite side, and also that the right eyelids did not perfectly close. At first it was hoped that the inflammatory swelling of the cheek explained these peculiarities, but soon it became evident that there was really paralysis of the right side of the face. In the course of a few days the paralysis was very pronounced. It was clear that the facial nerve was in some way involved in the mischief which had so rapidly and destructively attacked the middle ear, and it was feared that we had now to deal with some affection of the bone involving the walls of the Fallopian canal. The testing of the electrical reaction was purposely omitted in case of again exciting the resistance of the child, and particularly as no practical question of treatment by electricity required to be raised till after the lapse of a few weeks. Profuse purulent discharge still continued to come from both ears, in spite of the most careful application of the boracic acid treatment. Although every six hours the ears were syringed with a solution of boracic acid, then dried, and the powder insufflated, exuberant granulation tissue sprouted up from the walls of the external auditory canal and from the tympanic cavity.

Now that the child's general condition rendered it possible to ascertain the state of the hearing power, it was found that very great deafness existed, and that very loud speaking near to the head was essential in order that she might understand what was said. Her general condition continued to improve; nourishment was freely taken, and the strength gradually increased. At this stage she was conveyed back to town in order that the ears might receive the best attention, with the hope that their successful treatment might favour the disappearance of the facial paralysis. The boracic acid treatment, which is so frequently successful

in purulent disease of the middle ear, having received a fair trial without apparent effect, I now employed, in addition, a solution of nitrate of silver (forty grains to the ounce of water) every day, using it in the manner first suggested by Schwartz—namely, dropping the solution into the ear, and then, after two or three minutes, neutralising it with a weak solution of common salt injected into the ear. After a week's trial, no good effect being apparent, the treatment by nitrate of silver was abandoned. Noticing that Burckhardt-Merian strongly recommended an alcoholic solution of salicylic acid for purulent ear disease associated with diphtheria, I next tried this remedy, but found the pain and irritation to be so great that it had to be given up.

Diluted rectified spirit was next employed in the strength of one-third of spirit and two-thirds of water. The following process was carried out every eight hours: (1) Careful syringing with a warm solution of boracic acid; (2) removal of all the moisture in the interior of the ear with absorbent cotton on a cotton holder; (3) instilling into the ear fifteen drops (warm) of the diluted spirit; (4) allowing it to remain in the ear, while the child lay on the opposite side, for fifteen minutes; (5) drying the canal with cotton, and then placing a plug of salicylated cotton in the orifice of the ear. This treatment was, of course, applied to both ears. In addition, and in order to ensure still more thoroughly the complete expulsion of the purulent secretion, Politzer's method of inflating the middle ear was performed once a day after the syringing. The nasal passages were also syringed daily with a tepid solution of chlorate of potash. The strength of the spirit was gradually increased to equal parts of water and rectified spirit, but when employed stronger than this the pain excited by it compelled us to return to the weaker form. This method of treatment very soon proved itself to be the most efficient. The discharge perceptibly diminished; the granulation tissue began to shrink and the hearing power became more acute. For five weeks after its first appearance the facial paralysis remained unaffected. Then the child showed

more power of closing the eyelids, but probably another fortnight elapsed before the muscles of the cheek showed signs of mobility. First the naso-labial furrow deepened, and almost day by day some progress was observed in the recovery of the muscular power of the face. In about nine weeks from the time the paralysis was first observed it had completely passed off. There is no doubt that the returning power to the muscles of the face was co-incident with the improvement in the ear due to the spirit treatment. This improvement went steadily on, and in the course of four weeks from the beginning of the spirit treatment the granulation tissue had disappeared and the discharge reduced to a trace. When this was achieved very little of the tympanic membrane on either side was found to exist. The hearing was notwithstanding surprisingly good. In four months from the first attack of the fever the girl seemed almost as healthy as she had been before, though still somewhat dull of hearing. Her return to the country had no doubt contributed to this satisfactory result.

On May 15th, 1885, about eighteen months after the attack of scarlet fever, the condition of the hearing was as follows: Right ear—hearing distance for watch, $\frac{8}{40}$; for Politzer's Hörmesser, 8 ft. Left ear—hearing distance for watch $\frac{9}{40}$; for Politzer's Hörmesser, 9 ft. The whispered voice was heard in a quiet room at a distance of about 12 ft. with the eyes closed. The bone conduction of sound was on both sides better than the aerial. In each ear the only part of the tympanic membrane remaining was a piece of thickened membrana flaccida attached to the short process of the malleus. The handle of the malleus was not visible, but having lost the support of the tympanic membrane, it was probably drawn up by the tensor tympani muscle into the upper tympanic cavity. The inner wall of the tympanum was, owing to the loss of the tympanic membrane, clearly visible, and was seen to be lined by slightly thickened mucous membrane. The secreting process in the middle ear had long ago ceased. The throat still presented marks of the severity of the original disease.

The base of the uvula was deeply indented, and the posterior edge of the soft palate somewhat serrated. The mucous lining of the posterior wall of the pharynx was also irregularly thickened. With the exception of some tendency to nasal catarrh, the child seemed to be in a condition of robust health.

Remarks.—1. This case bears out what Burckhardt-Merian has especially drawn attention to*—namely, that scarlet fever, when complicated with or followed by diphtheria, is apt to give rise to a most destructive type of disease of the ear. It is probable that in such cases there is a real propagation of the diphtheritic membrane along the Eustachian tube to the tympanic cavity, and even to the external auditory canal. We have not simply to deal with an ordinary collection of purulent secretion in the tympanic cavity, with rupture of the membrane and evacuation of the pus; we have rather to do with a rapidly destructive ulcerative process which, as is shown by this case, denudes the organ of the tympanic membrane in a very short time. There is reason to believe that scarlet fever alone does not produce such havoc; the addition of the diphtheritic poison seems to impart that destructive tendency to the ear complication which may terminate in deaf-mutism, or even lead to a fatal issue.

2. From the favourable course of the facial paralysis in this case, we need not despair of recovery from this complication of purulent disease of the ear. In children, not only is the facial nerve, as it lies in its osseous canal on the inner wall of the tympanum, in close juxtaposition to the mucous membrane of the tympanic cavity, but the bony walls of this canal are very frequently defective when the neurilemma of the nerve is in actual contact with the mucous membrane. It is easy to understand how, with such an anatomical arrangement, the pressure of granulation tissue, swollen mucous membrane, or even of secre-

* See "Ueber den Scharlach in seinen Beziehungen zum Gehörorgan," von Alb. Burckhardt-Merian, in Volkmann's Sammlung, No. 182.

tion, may produce paralysis of the facial nerve without ulcerative disease of the bone, and therefore without the same gloomy prognosis.

3. The recovery of fair hearing also illustrates a fact which is not unfrequently observed—namely, that fair hearing may exist even when the tympanic membrane is almost quite destroyed. What is of more importance than the presence of the tympanic membrane is a normal mobility of the fenestral structures. If these structures, with the stapes, are not thickened, bound down by adhesions, or subjected to pressure, fair hearing power may be enjoyed, although the membrane, with even the malleus and incus, should have been swept away.

4. This case also shows in a striking way the value of treatment by rectified spirit in purulent disease of the middle ear associated with granular excrescences.
